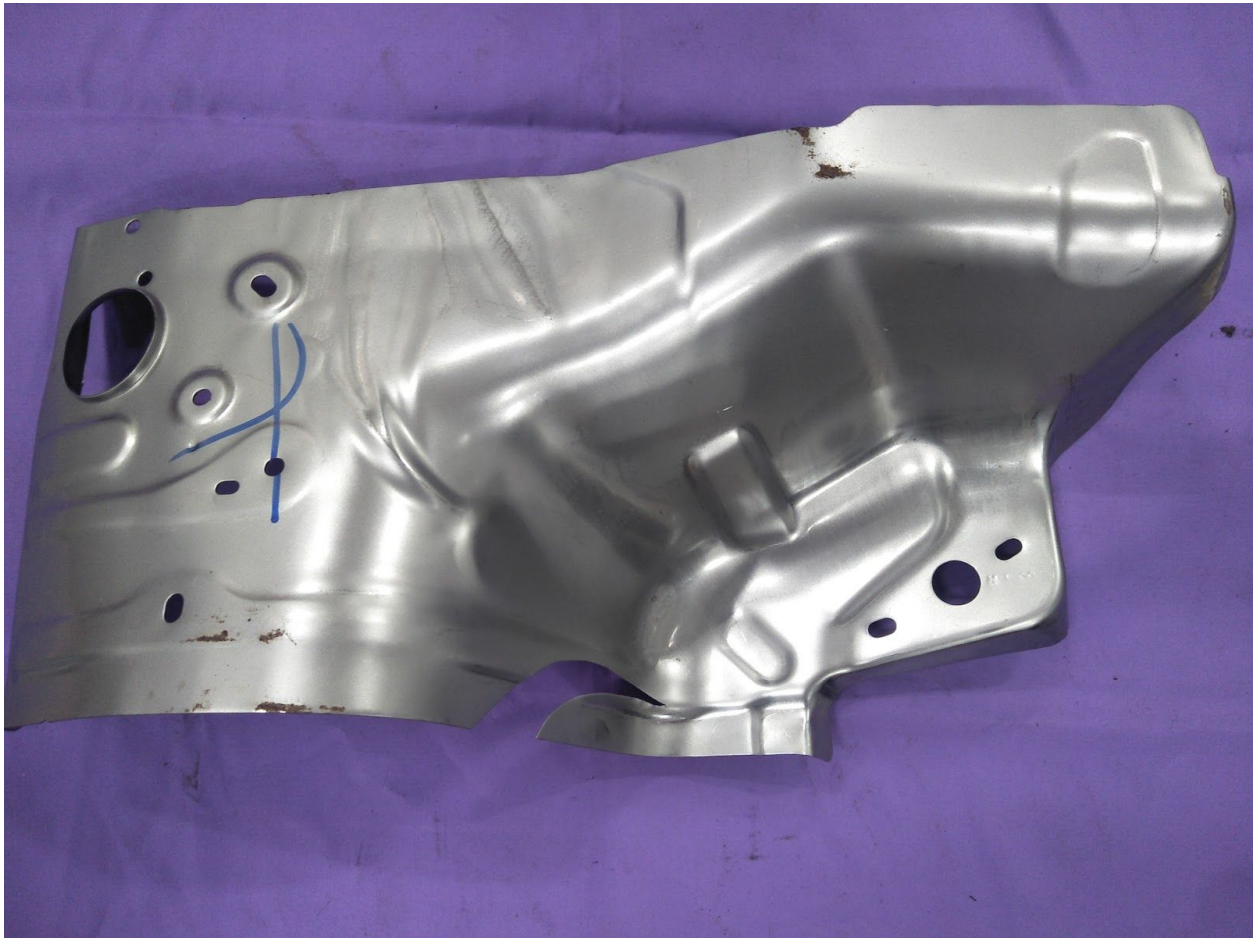JBM Group

Fender Apron Defect Detection AI
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Introduction

Detecting the defected aprons in industry can be automated. A deep neural network model can easily find out which one is defected and which one isn't with the help of Image Analysis using OpenCV and ML Technologies like Tensorflow, Keras, etc. Implementing them on Mobile Apps with a facility of scanner and in real time we can detect the defects as TensorflowLite gives an opportunity to use the saved models and predict on the spot.

Workflow

I've used Convolutional Neural Networks to build a deep learning model. It's an image analysis task, so CNN's are proven to be the best in that regard, I've chosen it. Matrix multiplications on image dimensions are quick with CNN.

Also, as we can observe the data is very less, overall 250 images. So, concept of transfer learning would help a lot by generating data from the existing data, expanding and training on the expanded data. For some reason that didn't work in the given time, so I've sticked to classic CNN model.

My model has 6 convolutional layers, each activated using ReLU units and Maxpooling layers are added between layers. Then, a Dense layer which takes only single dimension, so parameters are flattened before that layer. Finally a Dropout layer so that data doesn't overfit. Final dense layer is activated by sigmoid function, I've also tried ReLU but Sigmoid gave better results.

I've chosen the Binary Crossentropy methodology as there are two classes and one ensures not to be in the other class respectively. I've used RMSProp optimizer, one of the fastest compared to classic Adam optimizer.

Accuracy and Test Accuracy are printed every epoch. I've chosen 25 epochs, pretty high, 20 would be optimal. For vallidation, I've taken 60% validation split.